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Health-promoting Lifestyles of Nurses and Its Association with Musculoskeletal Disorders: A Cross-Sectional Study

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Background: Work-related musculoskeletal disorders are a significant concern for public health, leading to temporary and permanent disability. Health care workers, including nurses, are at high risk for these disorders. This study aimed to assess the health-promoting lifestyles of nurses and their association with musculoskeletal disorders and symptoms.

Methods: This study explored health-promoting lifestyles and their association with musculoskeletal symptoms in nurses. In this cross-sectional study, a total of 300 nurses working in the teaching hospitals affiliated with Shiraz University of Medical Sciences (SUMS), were selected using systematic random sampling. Data were collected by two questionnaires, the Health-promoting Lifestyle Profile (HPLP) and the Nordic Musculoskeletal Questionnaire (NMQ).

Results: Study findings showed that 47% of the study participants had a moderate level lifestyle. In terms of musculoskeletal symptoms, the most prevalent were reported in the back (88.33%), knees (83.33%), and thighs (71%). Moreover, Pearson correlation analysis revealed significant negative correlations between eating habits and musculoskeletal symptoms and interpersonal relations, while a significant positive correlation was found between nutrition and stress management with musculoskeletal symptoms.

Conclusion: Lifestyle variables are a good predictor for nurses' musculoskeletal symptoms. Therefore, knowledge of health-promoting lifestyle behaviors and practice of these behaviors are necessary to reduce musculoskeletal disorders among nurses.

Key Words: Health-promoting, Nurses, Lifestyle, Musculoskeletal symptoms

INTRODUCTION

Although various occupations have an essential role in the health and progress of society, related working conditions

can cause work-related disorders [1]. Among these disorders, work-related musculoskeletal disorders are the most common cause of work time loss and increasing labor costs and injuries and are one of the biggest occupational health problems in society [2]. Occupations have various life patterns, lifestyles, and expectations. Lifestyle encompasses the ordinary activities of people in their daily lives and that can have an impact on their health [3]. Through lifestyle choices, people may practice measures and activities that protect and promote their health and prevent diseases. Evidence suggests that the cause of many chronic diseases, such as low back pain, is related to lifestyle and human be-

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haviors [4]. Accordingly, establishing health-promoting behaviors is one of the best ways that people can protect and manage their health. Moreover, it is believed that work-related musculoskeletal disorders (MSDs) can be prevented through identifying factors affecting their occurrence. Identification of these factors helps in the design and development of ergonomic intervention programs and improvement of working conditions [5,6].

Every job has its own health-related risks and problems. However, health care providers experience many occupational injuries due to the nature of their work [7]. Due to increasing numbers of patients referred to health care centers, longer work hours, and changing shifts and patient workloads requiring complicated technical services, the risk of occupational injuries in health care workers will become more palpable [8,9]. Nurses play a pivotal role in the treatment sector, and factors such as inappropriate posture during occupational activities, repeated body movements, and constant and prolonged pressure on the muscles are all factors in the development of MSDs. In terms of physical activity in post-industrial jobs, the nursing profession ranks second highest. In fact, regarding work-related physical injuries, it is reported that nurses are more exposed to physical injuries with resulting symptoms such as back pain, than other health care professionals [10,11]. Health care organizations are responsible for promoting health care in the community, and providing better health services requires a healthy workforce; therefore, lifestyle choice on the part of health care staff not only affects their personal lives, but also impacts others [1]. In other words, lifestyle is a very important issue in this group of professionals and can affect their own health and the health of society [12].

The aim of the current study was to assess lifestyle and its association with musculoskeletal symptoms in nurses working in the teaching hospitals affiliated with SUMS, Iran. The main hypothesis in this study is that there is a significant relationship between lifestyle and musculoskeletal symptoms.

MATERIALS AND METHODS

1. Setting and sample

This cross-sectional study was conducted with nurses

working in the teaching hospitals affiliated with SUMS (Iran) from March to November 2016. A sample size of 300 nurses was estimated by considering a 95% confidence interval, 80% power, and r of 0.25. The samples were selected using a random sampling method from 35 different wards of six teaching hospitals and from every work shift. Using this method, a list of all nurses in each hospital was prepared; proportional to the frequency of nurses in each hospital, the sample size was calculated and randomly selected using a random number table with a systematic method. Nurses who had at least one year of nursing experience were included in the study. After selecting the eligible subjects, the researcher introduced himself to them and explained the aim of the study.

2. Ethical considerations

Written informed consent was obtained from all participants, who were assured that the information they provided would remain confidential. The present study was approved by Abadeh Branch, Islamic Azad University Ethical Committee (ethics code: 21695-11-31).

3. Data collection and analysis

For purposes of this study, data were collected with two questionnaires: A) HPLP and B) NMQ.

1) HPLP

To evaluate the lifestyles of nurses, Walker et al.'s [13] health-promoting lifestyle profile with 52 questions was utilized. This tool measures health-promoting behaviors using 6 dimensions as follows: Nutrition (dietary patterns and food choices with 6 questions), physical activity (following a regular exercise pattern, 5 questions), health responsibility (10 questions), stress management (identifying sources of stress and stress management measures, 7 questions), interpersonal relations (maintaining relationships with a feeling of intimacy, 7 questions), spiritual growth (having a sense of purposefulness, looking for personal development, and self-realization experience and satisfaction, 13 questions).

This questionnaire asked participants to specify their answers using a four-point Likert scale. Possible responses were never (1), sometimes (2), often (3), or routinely (4). The minimum total score for this questionnaire was 52, and

the maximum total score was 208. Subgroup scores were obtained by dividing the sum score for each item by the number of items in the subgroup. The scores for all items were added and divided by the total number of items to obtain the total HPLP score. A higher score reflected a higher level of health-promoting habits. The score in each subgroup was classified into three categories. According to the score, the subgroup is classified into three categories: poor level ($\leq 49\%$), moderate level (50-74%), and good level ($75\% \leq$).

The reliability of the original version of the health-promoting lifestyle questionnaire provided by Walker et al. [13] found a Cronbach's alpha of 0.86 for spiritual growth, 0.86 for health responsibility, 0.85 for physical activity, 0.87 for interpersonal relationships, 0.79 for stress management, and 0.80 for the nutrition dimension. Cronbach's alpha of the entire questionnaire was 0.94. Mohammadi Zeidi et al. [14] evaluated the validity and reliability of the Persian version of this questionnaire. They reported Cronbach's alpha of 0.64 for spiritual growth, 0.86 for health responsibility, 0.75 for interpersonal relationships, 0.91 for stress management, 0.79 for physical activity, 0.81 for nutrition, and 0.82 for the entire questionnaire [14].

2) NMQ

This questionnaire was developed by Kuorinka et al. [15] to assess musculoskeletal symptoms in nine areas of the body. The questionnaire probes for information about problems in the trunk-related organs (neck, shoulders, upper and lower back), arms (elbow, wrist, and fingers), and legs (hip,

knee, ankle, and toes) of nurses in the workplace. Its reliability was assessed by a test-retest method with a correlation coefficient of 91% [15]. Analysis of data was performed by SPSS version 21 (IBM Corp., Armonk, NY, USA), according to mean, standard deviation, independent t-test, Chi-square, and ANOVA. A $p < 0.05$ was considered significant.

RESULTS

1. Sample population

In this study, a total of 300 nurses were enrolled from different hospital wards; of those, 89 nurses were men (29.66%) and 211 were women (70.33%). In terms of age distribution, most of the participants were 35-45 years old. The mean \pm standard deviation of the age of participants was 30.6 ± 4.45 years. The majority of nurses in this study (66.34%) had 10-20 years of work experience. The characteristics of the participants are summarized in Table 1.

2. Lifestyle of nurses

Study findings revealed that 47% of the nurses had a moderate level lifestyle. In terms of physical activity 53% were categorized as poor; and 61.66% and 68.33% of the participants were at moderate levels in terms of nutrition and spiritual growth safety habits, respectively (Table 2).

3. Musculoskeletal symptoms

Table 3 shows the prevalence of musculoskeletal symp-

Table 1. Sample characteristics

(N=300)

Variable			Frequency n %		
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Marital status	Single	73 (24.33)	Working hours per day	6 >	11 (3.66)
	Married	223 (74.33)		6-12	177 (59)
	Divorced	4 (1.33)		12 <	112 (37.33)
Gender	Female	211 (70.33)	Level of Education	Bachelor	274 (91.33)
	Male	89 (29.66)		Master's degree or higher	26 (8.66)
Age (Year)	25 >	33 (11)	Work experience (Year)	5 >	68 (22.66)
	25-35	71 (23.66)		5-10	76 (25.33)
	35-45	132 (44)		10-20	104 (34.66)
	45 <	64 (21.33)		20 <	52 (17.33)
Residence	Urban	276 (92)	Working conditions	Shift	162 (54)
	Village	24 (8)		Fixed	138 (46)
Second Jobs	Yes	281 (93.66)	University educated	Governmental	183 (61)
	No	9 (6.33)		Non-government	117 (39)

Table 2. Health-promoting lifestyle profiles of participating nurses

Items	General life style n%	Physical activity n%	Nutrition n%	Interpersonal relations n%	Stress management n%	Spiritual growth n%	Health responsibility n%
Level							
Poor	127 (42.33)	159 (53)	62 (20.66)	119 (39.66)	101 (33.66)	83 (27.66)	131 (43.66)
Moderate	141 (47)	135 (45)	185 (61.66)	126 (42.55)	145 (48.33)	205 (68.33)	110 (36.66)
Good	32 (10.66)	6 (2)	53 (17.66)	55 (18.33)	54 (18)	12 (4)	59 (19.66)

Table 3. Prevalence of musculoskeletal symptoms in nurses

Body area	n	%
Neck	165	55
Shoulder	77	25.66
Elbow	49	16.33
Hand and wrist	101	33.66
Back	85	28.33
Knee	250	83.33
Femur	213	71
Lumbar	265	88.33
Leg and ankle	138	46

toms in the nurses over the past year based on area of the body. The most prevalent disorders were reported in the back (88.33%), knees (83.33%), and thighs (71%). Pearson's correlation method was used to investigate the associations between lifestyle parameters with musculoskeletal symptoms. A statistically significant negative correlation was found between physical activity and musculoskeletal symptoms ($p = 0.001$). Moreover, there was significant positive correlation between stress management ($p = 0.001$) and nutrition ($p = 0.02$) and musculoskeletal symptoms. Also, based on the results of the study, nurses with more musculoskeletal symptoms had fewer interpersonal relationships, and a significant negative correlation was found between safety habits and musculoskeletal symptoms ($p = 0.01$; Table 4).

In the neck region, there was no meaningful relationship between age or work history and musculoskeletal symptoms in the neck area ($p > 0.05$). Also, the Chi-square test demonstrated a significant relationship between gender and prevalence of symptoms of the skeletal muscles in the neck ($p < 0.05$). There was a significant correlation between age and musculoskeletal symptoms in the shoulder region. Also, the Chi-square test showed a significant relationship between sex and the prevalence of musculoskeletal symptoms in the shoulder region. There was a significant relationship

Table 4. Relationships between lifestyle and musculoskeletal symptoms

Dimensions of lifestyle & musculoskeletal symptoms	Significance level	Correlation coefficient
Physical activity	0.001*	-0.325
Nutrition	0.02*	0.431
Interpersonal relations	0.01*	-0.241
Stress management	0.001*	0.225

* $p < 0.05$.

between age or work experience and musculoskeletal symptoms in the elbow area. Also, a Chi-square test showed that there was a significant relationship between sex or marital status and the prevalence of musculoskeletal symptoms in the elbow area. There was no significant relationship between age or work experience and musculoskeletal symptoms in the wrist area. There was a significant relationship between age and prevalence of musculoskeletal symptoms in the back region. Also, the Chi-square test showed a significant relationship between sex and prevalence of musculoskeletal symptoms in the back region. In the lumbar region, there was no significant relationship between age or work experience and prevalence of skeletal musculoskeletal symptoms in the lumbar region. In addition, there was a significant relationship between gender and prevalence of skeletal-dislocation in the lumbar region. Independent statistical tests revealed no significant relationship between age or work experience and prevalence of musculoskeletal symptoms in the leg area. There was no significant correlation between age, work experience, and prevalence of musculoskeletal symptoms in the knee area. There was a significant relationship between age or work experience in the femur area and prevalence of musculoskeletal symptoms. Also, the Chi-square test showed a significant relationship between sex and prevalence of musculoskeletal symptoms in

the femur area. One-way ANOVA showed that, among health-promotion behaviors and age variables ($p = 0.17$), marital status ($p = 0.81$), and educational level ($p = 0.11$), there was no significant relationship. Among the sub-scales, there was a significant correlation between physical activity and sex in the independent t-test ($p < 0.001$), which also showed no significant difference between health promotion behaviors and sex variables ($p = 0.23$).

DISCUSSION

In the present study, it is noteworthy that the overall lifestyle of the majority of participating nurses (47%) was at the moderate level. Ghanbary et al. [16] believe that work shift can have various impacts on the lifestyles of individuals. In line with the present study, the findings of Heidari et al. [17] showed that general nurses were at a moderate level in terms of health-promoting behaviors. Evidence suggests that reduction in the feeling of well-being and health not only deprives nurses of health, but also influences the services they provide, indirectly affecting the quality of nursing services and community health [18]. In this regard, Alpar et al. concluded that healthy lifestyle behaviors in nursing students change from the beginning of their education to its conclusion [19]. Nevertheless, Lee et al. [20] reported a high level of lifestyle of nurses in their study on the assessment of work stress, health-promoting lifestyle, and coping strategies. However, the results found by Roushan et al. [21] contradict the findings of the present study, indicating that most participating nurses (52.6%) had quite a favorable lifestyle level, and that most of the nurses reported a moderate level regarding nutrition (61.66%). In this regard, Zverev et al. [22] evaluated dietary habits in shift work staff and concluded that most of them were susceptible to dietary-related work gain due to the nature of their jobs. This is consistent with the studies by Amani et al. and Phiri et al. [23,24]. The most undesirable behaviors were in health responsibility, which was consistent with the study of Roushan et al. [21].

Based on the findings, in terms of physical activity in lifestyle, 53% of nurses were at the poor level. Although, considering the probability of weight gain in nurses with respect to factors such as irregular working hours and the

stressful nature of the occupation, which in turn lead to sleep disorder and unfavorable dietary habits, compliance with appropriate lifestyle and health responsibility is necessary, especially regarding proper diet and physical activity [25]. In a study conducted by Casey et al. [26], the perceptions and experiences of the nurses regarding health promotion were assessed. It was reported that lifestyle measures would be performed infrequently and only if the nurse had enough time.

In the present study, pain in the back, knees, and thighs was reported more than in other parts. The findings revealed that back pain was the most common (88.33%) musculoskeletal symptom among nurses. Epidemiologic studies have demonstrated association between occupational factors and musculoskeletal symptoms. Also, some studies have suggested that the prevalence of pain, pain location, and other symptoms can be related to posture, work habits, and other demographic characteristics [27]. Smith et al. [28] studied musculoskeletal symptoms and psychosocial risk factors among Chinese hospital nurses and reported that the 12-month, period-prevalence of musculoskeletal complaints at any of four body regions was 70%. The lower back was the most commonly reported site (56%). López-Aragón et al. [29] also stated that the NMQ is an indirect method commonly used individually or complemented with other methods for evaluating MSD and possible associated psychosocial and labor risks.

Heidari et al. [30] also believe that the constant feeling of pressure in the workplace causes traumatic impacts resulting in emotionally exhaustion and gradual decrease in sense of competence in the performance of their duties. In this regard, Magnago et al. [31] reported a prevalence of back pain in 71.5% of Brazilian nurses. The findings of this study about the prevalence of musculoskeletal symptoms in the back are consistent with Tinubu et al.'s study in nurses [32]. In another study by Abedini et al. [33], 61.8% of nurses had musculoskeletal problems in the lower back. However, in Carugno et al.'s study of musculoskeletal disorder in Korean nurses, shoulders were the most sensitive part of the body [34].

Also the results showed of the Pearson correlation test revealed that physical activity and interpersonal relations were negatively correlated with musculoskeletal symptoms, while

there was a significantly positive correlation between nutrition or stress management and musculoskeletal symptoms. In line with the present study, Hestbaek et al. [35], in their study on adults, found significant relationships between the components of lifestyle and lower back pain. Chen et al.'s findings regarding sedentary lifestyle and low back pain was confirmed. In this regard, they stated that limited evidence suggests sedentary behavior as a risk factor for low back pain [36]. Although the findings of this study are indicative of the moderate level lifestyle of nurses and the high prevalence of musculoskeletal disorders in some parts of their bodies, the study also has some limitations. Personality traits; psychological backgrounds; and social, cultural, and individual differences along with psychological states when replying to the questionnaire were uncontrollable variables in this study. On the other hand, data were collected by self-reporting methods; hence, study results may not clearly reflect lifestyle and musculoskeletal disorders of participating nurses.

CONCLUSION

Due to its nature, nursing is one of the occupations with a high prevalence of work-related musculoskeletal disorders. Based on results of the current study and similar reports regarding the increase in prevalence of musculoskeletal disorders in nurses, improving the quality of self-care activities, controlling physical strains, and enhancing working conditions must be a priority. Therefore, it is recommended that specific barriers to promotion of nurses' health be identified, and that educational courses be provided on health promotion and modification of lifestyle patterns, such as nutrition, safety principles, and physical activity, for this professional group.

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